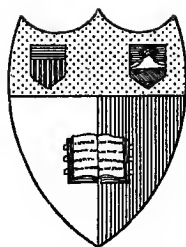


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New York Central

America's Greatest Railroad System —the New York Central

BY CHARLES FREDERICK CARTER

**REPRINTED FROM
TRANSPORTATION WORLD, NEW YORK
ISSUES OF MARCH AND APRIL, 1921**

1831



1921 NEW YORK CENTRAL LINES

Public Confidence

FROM the pioneer DeWitt Clinton Train of 1831 to the Twentieth Century Limited of 1921, the New York Central Lines have sought to merit public confidence by high standards of public service and public relations.

Keeping pace with the growth of what has become the richest industrial region of the world, these Lines now haul a tonnage greater than that of the railways of any foreign country.

In 1920, for example, the freight traffic of the New York Central Lines was greater than that carried by all the railways of England and France.

To maintain such a service, so that it will be at all times adequate to the public needs, it is vital to have that intangible but invaluable thing known as good-will.

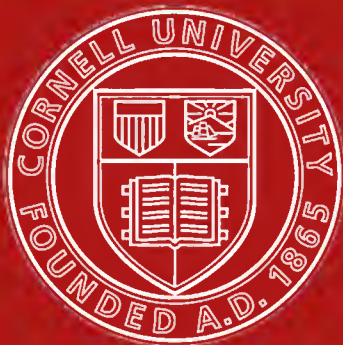
Without the good-will of the public, a railroad system of 13,000 miles stretching across twelve states and drawing traffic from many more, would be working under a back-breaking handicap. Its growth could not be financed without public confidence.

The New York Central Lines have long recognized that enduring good-will can only be built upon a foundation of good service and right public relations.

That this public good-will may be preserved and strengthened, it will continue to be the policy of the New York Central Lines to present its problems frankly and fully to the public.

THE NEW YORK CENTRAL LINES

MICHIGAN CENTRAL — BIG FOUR — LAKE ERIE & WESTERN
BOSTON & ALBANY — TOLEDO & OHIO CENTRAL — PITTSBURGH & LAKE ERIE
NEW YORK CENTRAL AND SUBSIDIARY LINES



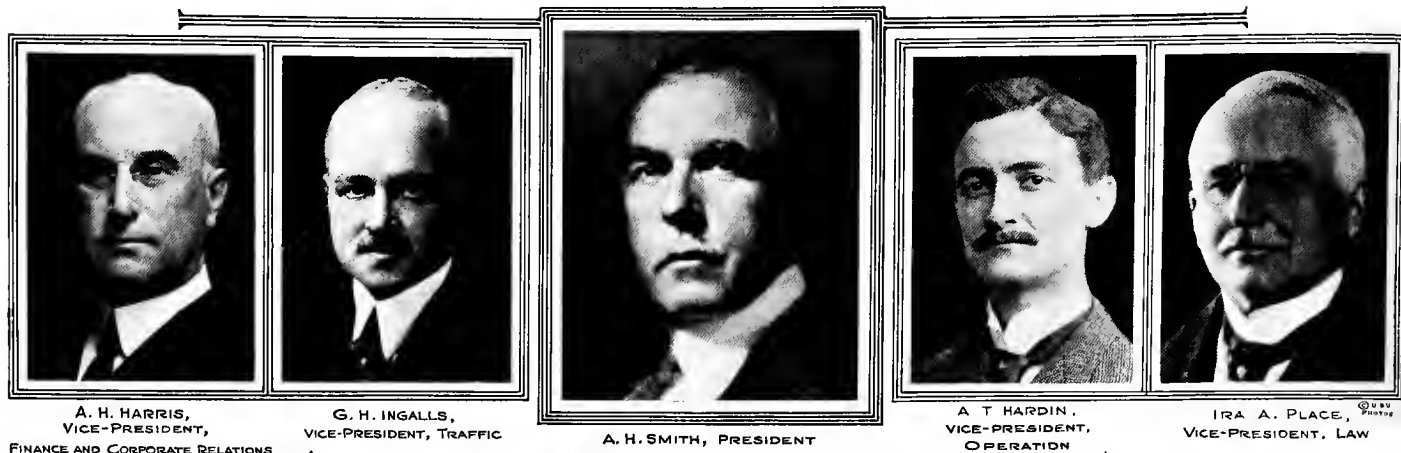
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LEADING EXECUTIVES OF THE NEW YORK CENTRAL SYSTEM



A. H. HARRIS,
VICE-PRESIDENT,
FINANCE AND CORPORATE RELATIONS

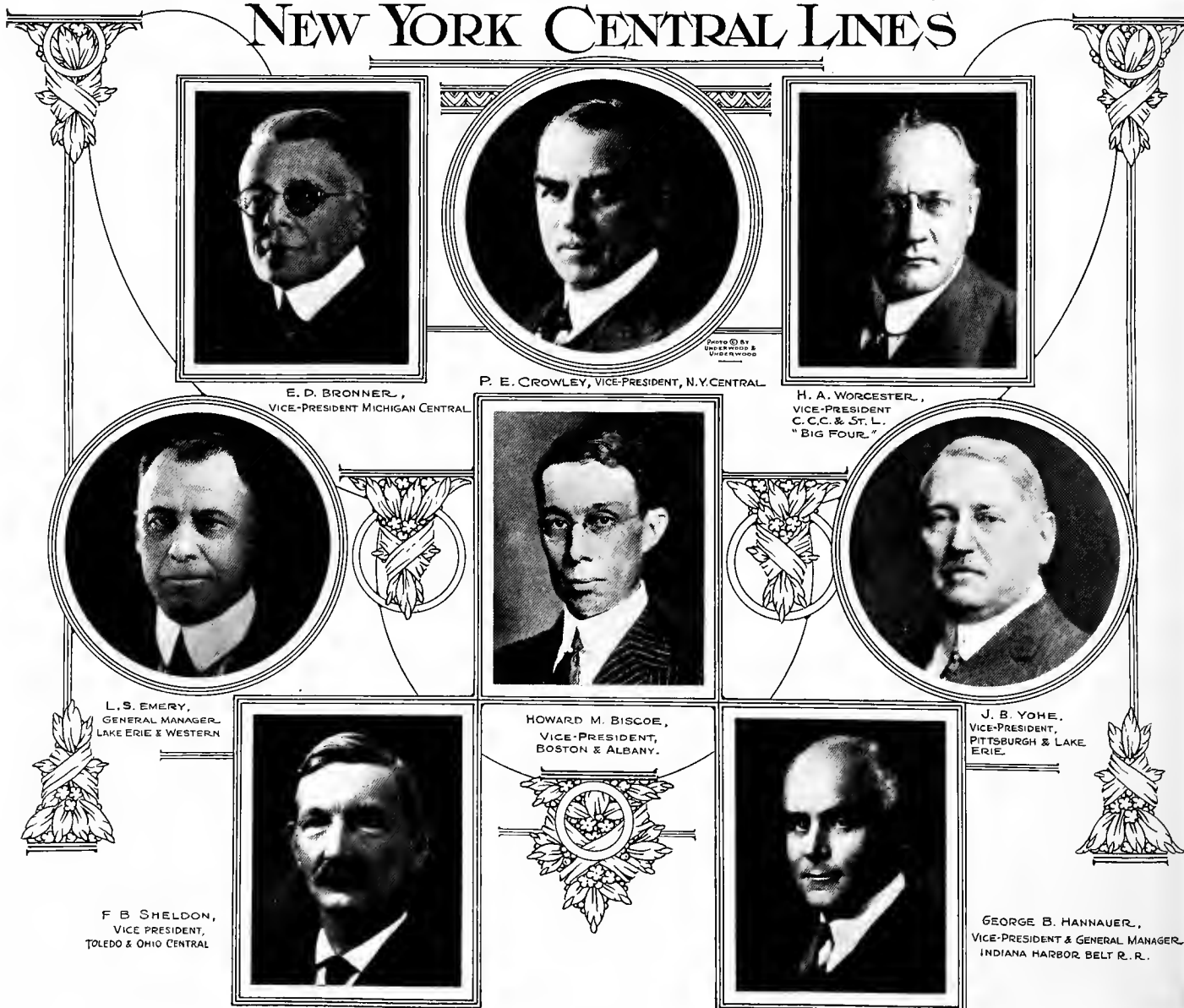
G. H. INGALLS,
VICE-PRESIDENT, TRAFFIC

A. H. SMITH, PRESIDENT

A. T. HARDIN,
VICE-PRESIDENT,
OPERATION

IRA A. PLACE,
VICE-PRESIDENT, LAW

NEW YORK CENTRAL LINES



E. D. BRONNER,
VICE-PRESIDENT MICHIGAN CENTRAL

P. E. CROWLEY, VICE-PRESIDENT, N.Y. CENTRAL

H. A. WORCESTER,
VICE-PRESIDENT,
C. C. & ST. L.
"BIG FOUR."

L. S. EMERY,
GENERAL MANAGER,
LAKE ERIE & WESTERN

HOWARD M. BISCOE,
VICE-PRESIDENT,
BOSTON & ALBANY.

J. B. YOHE,
VICE-PRESIDENT,
PITTSBURGH & LAKE
ERIE.

F. B. SHELDON,
VICE PRESIDENT,
TOLEDO & OHIO CENTRAL

GEORGE B. HANNAUER,
VICE-PRESIDENT & GENERAL MANAGER,
INDIANA HARBOR BELT R. R.

America's Greatest Railroad System —the New York Central

EDITOR'S NOTE—Charles Frederick Carter, author of this article, probably has written more published words about American railroads than any living man, being particularly noted for his popular interpretations in books and magazines of the big statistical, technical and scientific facts of the transportation industry. His lifelong studies have given him a remarkable familiarity with all phases of transportation, and he has written about our various railroads, big and little, from coast to coast. Mr. Carter's historical textbook, "When Railroads Were New," is known all over the world, and of his later work, his descriptions of the great carriers of the country in the series entitled "Big Railroad" have had widespread reading and commendation.

In the accompanying article on the New York Central Lines, Mr. Carter has accomplished a notable literary feat in condensing into a few

pages the essence of his exhaustive studies of this gigantic and wonderful railroad system, whose extent and activities it obviously would require many volumes fully to describe. The New York Central, by every standard of measurement, is one of America's greatest institutions. Particularly in its remarkable war-time service, when all previous high marks of performance were surpassed, and in its rapid rehabilitation of personnel, plant and equipment since the return from government operation, the Central has fully measured up to the highest American business standards and traditions.

Mr. Carter in his survey and analysis is impressed mostly by the advantages of strategic position of the New York Central Lines in the territory of largest population and greatest industrial activity, assuring continuously increasing traffic and consequent prosperity of the system.

By Charles Frederick Carter

A CRUDE experimental strap-iron track traversing the 17 miles between Albany and Schenectady in 1831 was the nucleus from which has been developed within the lifetime of the present Chairman of its Board of Directors, the New York Central system of 12,550 miles of main line, constituting the greatest transportation plant under one management in America or in the world. Upon its rails has been wrought much of the history of inland transportation. It has been the cradle of inventions and the initial proving ground of the most notable improvements in the progress of transportation. Here the first important change from steam to electric operation was installed. On these lines a long list of improvements in mechanisms and methods has been originated while others have been refined and perfected; and here far-seeing statesmanship has developed and maintained a policy always a step in advance of the times.

All of these features of progressiveness have combined to make this America's greatest railroad system.

The New York Central Lines comprise the New York Central Railroad, which represents 186 predecessor companies, with main line extending between New York and Chicago, the final consolidation of which was effected to embrace the old Lake Shore & Michigan Southern on December 23, 1914, making a total of 6,075 miles of main line and branches, together with leased, controlled and subsidiary lines sufficient to swell the grand total to 12,550 miles. The whole system includes what were originally 315 separate companies. The more important constituent lines of the system in the latter category are: The West Shore Railroad, from New York and Weehawken, N. J., to Buffalo; The Boston & Albany Railroad, from Boston to Albany; The Michigan Central Railroad, from Buffalo and Niagara Falls to Chicago and Mackinaw City, Mich.; The Cleveland, Cincinnati, Chicago & St. Louis Railway (Big Four), from Cleveland to Columbus, Cincinnati, Louisville, Evansville, Chicago, Peoria, Cairo and St. Louis; The Pittsburg & Lake Erie Railroad, from Youngstown and Sharon through Pittsburg to Brownsville and Connells-

ville; the Lake Erie & Western Railroad, from Sandusky to Fort Wayne, Indianapolis, Michigan City and Peoria; the Toledo & Ohio Central Railway, from Toledo to St. Mary's, Columbus and Corning; the Kanawha & Michigan Railway, from Corning, O., via Charleston to Gauley, W. Va.; the Toronto, Hamilton & Buffalo Railway, from Welland and Port Maitland, Ont., and from Ashtabula, Ont., by car ferry, to Hamilton, Brantford and Waterford, Ont.; The Indiana Harbor Belt Railroad, from Gary and Indiana Harbor, Ind., through and around the City of Chicago to Franklin Park, Ill.

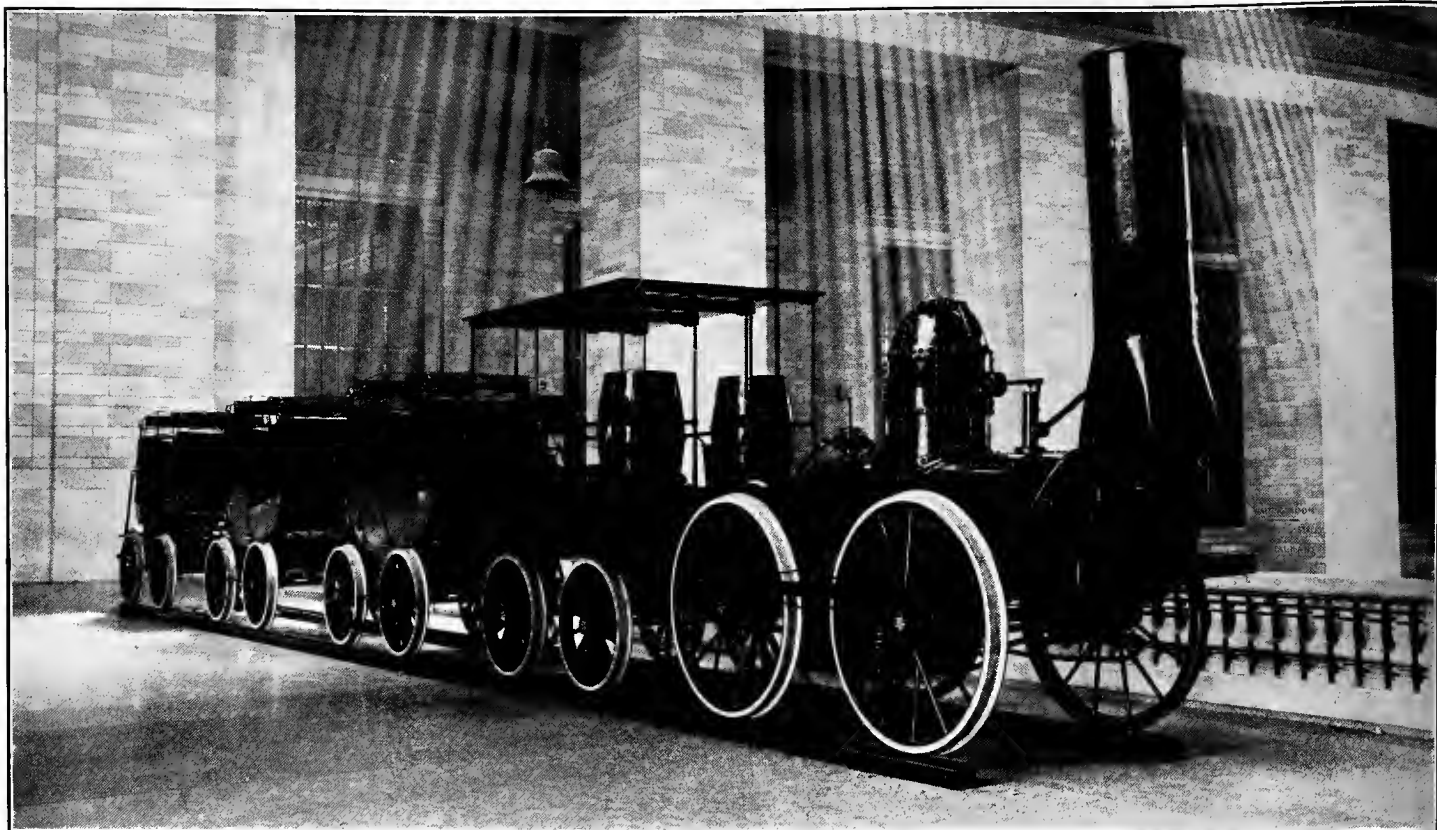
By consulting a map it will be seen that a diagrammatic outline of the railroad system thus briefly defined would bear a rough resemblance to a tree, the trunk of which, lying across the center of the Empire State from Albany to Buffalo, sends its roots down to the seaports of New York, Boston and Montreal and the central spike of the top to Chicago on the west, with principal branches growing out to Mackinaw City, Mich., on the Northwest and St. Louis and Cairo, Ill., on the Southwest. The bulk of the top is a bewildering maze of big

and little branches which look as if they had been torn and twisted by a windstorm. Considered as a tree the New York Central Lines are far from symmetrical; but regarded as a great transportation machine closer study will show that they are almost perfect.

It will be observed that the New York Central Lines lie in the States of New York, Massachusetts, New Jersey, Pennsylvania, West Virginia, Ohio, Kentucky, Indiana, Michigan, Illinois, Missouri and Vermont, and the Canadian provinces of Quebec and Ontario. The twelve states named have 51,530,784 inhabitants, 50.3 per cent of the population of the nation. This territory turns out 64 per cent of the manufactured products of the United States and mines a similar proportion of the country's coal. The two provinces served have the larger part of the population and the bulk of the manufacturing industries of Canada. Moreover, the New York Central Lines pass through the sections most densely populated and most productive of traffic because the transportation facilities provided have enabled them to develop more rapidly than less favored regions.



COMMODORE CORNELIUS VANDERBILT



The "De Witt Clinton" Engine and Coaches, the First Train Operated in the State of New York, as It Appears on Exhibition in the East Gallery of Grand Central Terminal, New York

New York City, the principal Eastern terminus, is the metropolis of the Western hemisphere, already crowding London for the distinction of being the largest city in the world, with a population in the metropolitan zone of more than six millions to be provided for. New York City is the principal seaport of America. Over its wharves pass 43 per cent of all the foreign commerce of the United States, including that via the Pacific coast and Canadian and Mexican borders. And of this vast traffic, the New York Central Railroad alone handles one-fourth over its own piers or on its great fleet of 306 harbor craft.

Boston, the metropolis and principal seaport of New England, is another point of heavy volume of foreign traffic for the New York Central, over its leased line, the Boston & Albany Railroad. Boston ranks third in ports on the Atlantic seaboard. New York and Boston together handle 87 per cent of the foreign commerce reaching the Atlantic coast.

Montreal, the metropolis and principal seaport of Canada, since it is at the head of navigation for ocean-going craft on the St. Lawrence, is reached directly by two New York Central lines, while the traffic from the only other direct line from the East to Montreal is turned over to the New York Central at Albany.

Only Freight Tracks On Manhattan

However important the New York Central Lines may be as a part of international trade routes the greater part of their traffic, of course, is domestic. For the handling of this, advantage secured by enterprise and foresight, have been utilized in providing exceptional facilities.

One notable advantage is that the New York Central is the only railroad having freight tracks and terminals on Manhattan Island. The old Hudson River Railroad, opened in 1847 and now a part of the New York Central, was built when New York was a very modest city at the lower end of Manhattan Island. The freight station at St. John's Park, when first established, was located as such facilities usually are, on the outskirts of the city but near enough to be con-

venient for the limited traffic of the day. Long ago the city was extended many miles beyond St. John's Park. The old freight station, still in active service, is now in the heart of the wholesale dry goods and grocery districts and almost within the proverbial stone's throw of the upper limits of the financial district. It saves the merchants of New York a good many thousands of dollars in trucking charges in the course of the year. As the city grew additional freight stations were opened at Thirty-third Street, then at Sixtieth Street and at One Hundred and Thirtieth Street.

The value of these city terminals will be appreciated when it is remembered that they are always available regardless of weather conditions which impede, or interrupt altogether, navigation of New York Harbor and the Hudson River by car floats and lighters, the only other means of receiving or shipping railroad freight. At times these facilities have been practically the sole source of supply of food and fuel for New York's millions.

Plans were perfected years ago for enlarging these facilities by a subway line from the Harlem River to Sixtieth Street and thence an elevated line to Canal Street, to provide sidings for manufacturing industries and connect with storage warehouses and have direct access to steamship piers, but agreement with public authorities never reached the stage of actual construction.

In addition to these exceptional advantages the New York Central through its West Shore Railroad, has extensive terminals on the West side of the Hudson at Weehawken, N. J., and at Hoboken and Jersey City, farther down, including wharves at which steamships may load direct from cars.

As a result of such an exceptional position on both sides of the river the New York Central Lines carry one-fourth of all the freight between the metropolitan district and Buffalo and points West, and a full one-third of all the freight between Manhattan Island (New York City proper) and the West. No less than 40 per cent of the milk and cream for the city is delivered by the New York Central.



Famous old "999" When It Made the World's Record With the "Empire State Express," Still Doing Active Service After 33 Years

The extensive terminals of the Boston & Albany Railroad give the New York Central Lines an equally advantageous position in Boston for the expeditious and economical handling of foreign and domestic traffic. At Montreal and Ottawa, the capital of the Dominion, at Ogdensburg, Buffalo, Niagara Falls, Detroit and Mackinaw City—all frontier points—New York Central Lines connect directly with all of the Canadian railroads and thus secure a very large share of the traffic interchanged between Canada and the United States. At Buffalo traffic is interchanged not only with other railroads to the West and South, but also with the lake steamship lines which move an immense amount of traffic during the season of navigation, including iron ore, copper, grain, flour, lumber and shingles. In 1919 over 31,000,000 bushels of grain bound East was transferred to New York Central rails at Buffalo. At Ashtabula, Ohio, the railroad facilities for handling ore and coal between steamship and car are among the largest and most efficient extant and a vast tonnage of ore for the steel mills of Pennsylvania and coal for the Northwest is transported every season.

In addition to the vast load of the basic essential raw materials, no less than 64 per cent of all manufactured products turned out in the United States come from the States served by the New York Central Lines. New York State alone produces approximately four billion dollars' worth of manufactured goods annually and the New York Central is so favorably situated that the lion's share of this great output naturally falls to it. In Massachusetts the busy manufacturing cities of South Framingham, Worcester, Springfield, Westfield, Pittsfield and others are located on the Boston & Albany. Through direct connections with New England railroads all the important industries in this busiest of manufacturing regions are reached by the New York Central Lines.

Two-thirds of all the automobiles manufactured in the United States are produced in the cities of Detroit, Toledo, South Bend, Lansing, Cleveland and Buffalo, all of which are reached by the New York Central Lines, which have made a special effort to provide adequate equipment for the handling of the product as well as for the delivery of the raw materials. For that matter, the territory served by the New York Central Lines is almost a continuous succession of manufacturing plants producing about everything used by civilized society—gloves, silks, fine furniture, pottery, glassware, woollens, chemicals and so on. The principal plants for the

manufacture of typewriters, cameras and photographic materials are located on the New York Central.

Of the total volume of freight transported by the New York Central Railroad proper (not including allied lines of the system) in the year 1919 just 24,475,482 tons, or 25.3 per cent, was manufactures. The average of manufactures for all the railroads of the country is only 16.9 per cent of the total volume of freight. This comparison shows two things: first it shows most impressively the great industrial activity of the territory traversed by the New York Central; second, it indicates revenue possibilities most interesting to the stockholders, at least, if to no one else, for manufactures pay higher rates than the bulkier low-grade freights such as coal and ore.

Make-up of the Vast Tonnage

While the New York Central Lines are not usually classed as "coal roads," they serve States which produce 78 per cent of all the coal mined in the Nation. The bituminous coal fields of Pennsylvania, West Virginia, Ohio, Indiana and Illinois are all reached directly by them, and as they also serve the great industrial centers the coal can be shipped in solid trains at the utmost of economy in handling. From the celebrated Pittsburgh bituminous coal districts the New York Central, in connection with its Pittsburg & Lake Erie, famed as "The Biggest Little Railroad on Earth," on account of its phenomenal records in handling traffic, carries one-fourth of all the coal which goes from lake ports in vessels for consumption in the great Northwest. Of the tonnage from the bituminous fields of Central Pennsylvania the New York Central carries 60 per cent of all the coal shipped by all-rail routes for consumption in New England, and 75 per cent of all the coal shipped by all-rail routes to Eastern Canada. New York Central Lines reach the mines producing the highest grades of Illinois and Indiana coals and they have terminals for delivery of two-thirds of the coal from these fields. The New York Central Railroad alone carries from 27,000,000 to 37,000,000 tons of bituminous coal annually, while all the New York Central Lines together haul an aggregate of 100,000,000 tons a year. To this huge total should be added 18,000,000 tons of anthracite.

Through its Pittsburg & Lake Erie, the New York Central was a pioneer in the transportation of coke from the famous Connellsville field. It was also among the first to enter the important "Klondyke," or Lower Connellsville field which



GRAND CENTRAL TERMINAL, NEW YORK

Photographed from a neighboring skyscraper, showing (in foreground) 42nd Street crossed by the Park Avenue viaduct leading to the elevated roadways of Depew Place; (at left) the Belmont and Biltmore Hotels, Yale Club and Vanderbilt Avenue buildings; (at right) the edge of the mammoth Commodore Hotel, and (in the background) a vista of Park Avenue north from 45th Street, beneath which lie the electrically-operated yards and main-line passenger tracks of the New York Central

produces a valuable by-product coking coal. Through the Toledo & Ohio Central and Kanawha & Michigan, also controlled lines, the by-product coal fields of West Virginia are also reached, from which supplies are drawn for the great steel mills of Ohio, Indiana and Illinois.

The great steel and iron producing centers—Buffalo, Erie, Cleveland, Lorain, Toledo, Detroit, the Mahoning and Shenango Valleys in Ohio, Pittsburg, Gary and Chicago—are all reached by New York Central Lines. These lines haul 10,000,000 tons of iron ore to the blast furnaces at these centers annually and an equivalent volume of iron and steel products away from them. Of all the ore used in the Mahoning and Shenango Valleys and the Pittsburg and Monongahela Valley districts, areas of the greatest ore consumption, the New York Central and Pittsburg & Lake Erie carry 30 per cent. The secret of the phenomenal traffic records of the latter is that it moves solid trainloads of coal and coke to lake ports and solid trainloads of ore from the lake ports to the blast furnaces around Pittsburg and in the Monongahela Valley. The New York Central Railroad reaches the important newsprint and other paper-producing districts of New York, Michigan and the Province of Ontario; and through the

“Big Four” (Cleveland, Cincinnati, Chicago & St. Louis Railroad), the paper producing district of Ohio.

At Cincinnati and Louisville the system, through its “Big Four,” interchanges the manufactured products of the East for the fruits, vegetables, lumber, cotton and pig iron and other Southern products destined for Eastern markets. At Peoria, through the “Big Four” and its Lake Erie & Western, connection is made with converging routes from the Central West from which there moves East a large and steady volume of grain, grain products and other foodstuffs. At St. Louis and Cairo, where the Ohio River flows into the Mississippi, the most important two gateways between the East and the Southwest, the “Big Four” interchanges manufactures from the East for vegetables, fruits, lumber, cotton, live stock and other products of the great Southwest, destined for the insatiable markets of the East.

At Chicago, the great gateway between East and West, the New York Central Railroad occupies a most advantageous position, for it was the first Eastern railroad to enter the city, then a straggling town half mired in the muddy lowlands on the shores of Lake Michigan and the Chicago River, which the wise men of the day rather thought was doomed to be



"Empire State Express" Leaving New York City on Curve at Marble Hill (Photo by General Electric Company)

overshadowed by Milwaukee, and the good location which the pioneer railroad builders secured has been retained.

Here the New York Central interchanges with Western connections, either direct or through its extremely busy subsidiary, the Indiana Harbor Belt Railroad, or through its Illinois division, commonly known as the "Kankakee Belt Route," manufactured products of the East for the grains, fruits and other foodstuffs of the West. Solid trains of refrigerator cars laden with meats and meat products from the great packing houses of Chicago, Kansas City and Omaha, and fruits from California pass over the Indiana Harbor Belt Railroad, being iced in transit at the Blue Island ice house which has a capacity of six hundred cars a day, the largest plant of its kind, to the New York Central to feed the hungry millions of the East.

To summarize, New York Central Lines in 1918 carried a grand total of 266,165,143 tons of freight, which was 11.73 per cent of the tonnage hauled by roads of "Class I," which is a designation devised by the Interstate Commerce Commission for railroads doing a business of more than a million dollars a year. It may help to realize how great the recent increase in rates was needed to know that the average freight charge for this service was less than nine-tenths of a cent per ton per mile.

A more vivid statement of the volume of traffic of New York Central Lines, or the public service they render, may be found in the "ton-miles of revenue freight per mile of road," or "density of traffic." This is found by multiplying the number of tons of freight by the number of miles hauled and dividing the product by the total number of miles of road utilized in freight service. The average for all "Class I" roads in the United States in 1918 was 1,729,183; for the New York Central Lines 3,338,805. Freight earnings in 1918 were \$175,869,945. In 1919 there was a slight falling off in freight revenue due to the reaction following war activities. But in the first five months of 1920 there was an increase of 12.5 per cent in the volume of freight traffic as compared with the corresponding period of 1919.

Scope of Population Served

The foregoing brief summary of the enormous normal industrial activities in the territory served by the New York Central Lines, with the resulting great volume of freight traffic, warrants the inference that passenger traffic must also be very heavy. Such an inference is amply corroborated by the facts. Not only do the States served by New York Central Lines have 50.3 per cent of the total population of the United States, but a large proportion of their population is concentrated along these lines.

There are in the whole country, 687 cities and towns having a population of 10,000 or more. Of these 373, or 54 per cent,

are located in the States served by the New York Central; and of these no fewer than 162, that is 46 per cent of such cities in these states, or 23.5 per cent of all in the United States, are reached directly by New York Central Lines. In the Provinces of Quebec and Ontario are 27 similar cities and towns, of which 12, or 44 per cent are served by New York Central.

Going more into details, there are in the Empire State, with its population of approximately 11,000,000, 52 cities and towns having 10,000 inhabitants or more, of which 34, or 65 per cent, are served by the New York Central Railroad. In Ohio, New York Central Lines serve 22 such cities out of a total of 43; in Indiana, 25 out of a total of 32; in Illinois, 14 out of 38.

To state the matter another way, the cities and towns along the *main line* between New York and Chicago alone have a population of more than 12,000,000, or, roughly 11 per cent of the population of the United States. This gives an average of more than 12,000 inhabitants to every mile of road; so that, notwithstanding the farms to be observed from the car windows along the way, there is, in effect, a continuous city along the New York Central all the way between New York and Chicago. And what is true of the main line is substantially true of practically all subsidiaries.

With the cities of New York and Boston on the East, Montreal and Toronto on the North, Cincinnati, Chicago and St. Louis on the West, and the important cities of Buffalo, Cleveland, Toledo and Detroit in between, it will be seen that the New York Central Lines furnish through train service between practically all the important cities in the Eastern part of the United States and Canada.

This density of population not only yields a very large passenger revenue, but it is also conducive to economical operation, for it insures a maximum loading of cars and trains in both directions, resulting in a high average revenue per passenger train-mile, the average for 1919 being \$3.25 per train-mile for a total of 24,000,000 miles traveled by passenger trains on the New York Central Railroad alone. The New York Central Railroad (not lines, remember) carries from 53,000,000 to 57,000,000 passengers annually, for which it received, prior to the recent rate increase, \$75,000,000.

To transport so great a number of passengers safely is no small task. It involves the operation of 800 passenger trains a day. Through travel between New York City and Chicago is so heavy that twelve trains a day each way are required to accommodate it, for the New York Central carries more than 50 per cent of all the through traffic between the two cities, the other short half being divided between six other roads.

The Twentieth Century Limited

A further evidence of public appreciation is to be found in the fact that the Twentieth Century Limited, the apotheosis



View of New "Container Car" Just Invented by the New York Central and Hailed as a Forerunner of a New and Improved System Providing "Store Door Delivery" of Less-than-Carload Shipments, Both Freight and Express

of modern passenger service, is so popular that it is frequently run in two or three, and sometimes in even four or five sections and earns more than \$3,500,000 annually. Making the trip of 974 miles in twenty hours the "Twentieth Century Limited" furnishes what comes very near to being a commutation service between the two cities; for one may put in a part of a business day at either terminal and reach the other at the beginning of the next business day. The first twenty-hour train between Chicago and New York was put on in 1893 to accommodate travel to the World's Columbian Exposition. For a time the run was made in eighteen hours; but it was found that the extreme speed required to make the journey in this time involved wear and tear on roadbed and equipment, and other considerations, for which there was no adequate compensation, since the requirements of the traveling public were fully met by a twenty-hour train.

Now a Six-Track Plant

It will be of interest to know something of the transportation plant which accomplishes the truly enormous tasks outlined. To begin with the New York Central Railroad, the main trunk of the great system, there are six main-line tracks practically all the way from New York City to Buffalo—a distance of 438 miles. This is the only six-tracked railroad for so great a distance in the world. To be sure, the layman might not concede that there are six tracks in the main line, since they do not lie side by side all the way. One pair of tracks lies along the East shore of the Hudson River, constituting the Hudson River division. A part of the distance this division is already four-tracked and the remainder of the way soon will be. A second pair of tracks lies on the West Shore of the Hudson, constituting the old West Shore road.

The Harlem division, separated from the Hudson River division by a range of hills, is double-tracked a little less than half the way between New York City and Chatham from whence it reaches Albany over the rails of the Boston & Albany Railroad. Between Albany and Buffalo the New York Central main line has four tracks, while the West Shore's two tracks at intervals lie side by side with the first

four on the same right-of-way. If the layman might be disposed to regard this arrangement as three railroads, from a legal standpoint, and especially in the eyes of the operating staff, it may be stated that these six tracks are one railroad operated as a unit, train movements on which are directed from the same office in Albany by dispatchers sitting side by side.

West of Buffalo, the New York Central is double-tracked all the way to Chicago, with third and fourth main-line tracks at intervals. On the north shore of Lake Erie, the Michigan Central affords another double-track route from Buffalo to Chicago under the same management. Of the total of 6,075 miles of main line operated by the New York Central Railroad, 698 miles are four-tracked, 783 miles are three-tracked and 2,175 miles are double-tracked. The single-tracked remainder is in branches. The entire length of the West Shore is double-tracked. Of 1,862 miles operated by the Michigan Central, 663 miles are double-tracked. The "Big Four" operates 2,408 miles, of which 663 are double-tracked.

Main Line Most Superb

The great main line of the New York Central between New York and Chicago is, beyond dispute, the most superb railroad in the world. In the first place it runs at practically water level for the entire distance, the only hill worthy of the name being the three-mile grade at Albany in passing from the valley of the Hudson to that of the Mohawk, where the heavy Westbound trains require a "pusher" engine. No other railroad anywhere in the world can boast a water level route for so great a distance. This low-lying open country allows curves of very wide radius, so that owing to the absence of heavy grades and sharp curves, unusually heavy trains can be operated. The track is laid with 100-pound and 120-pound steel rails on hardwood ties, ballasted with rock, and protected by automatic block signals and interlocking plants representing an investment of \$18,000,000.

Perhaps it may help some in forming an idea of the vastness of the New York Central Railroad plant to know that it includes 40,000,000 ties costing approximately \$40,000,000. These ties placed end to end would form a straight line 60,000



Copy of Painting by William Herndon Foster Entitled, "The Twentieth Century Limited—The Greatest Train in the World"
Owned by A. H. Smith, President New York Central Lines

miles long. Placed on these ties are 1,727,000 tons of steel rails worth at recent prices \$72,534,000. Bridges to the number of 5,500 and 13,500 culverts, also under the care of the bridge department, represent an investment of more than \$60,000,000; track material other than ties and rails, such as frogs, switches, spikes, bolts and the like cost more than \$16,000,000.

This huge investment in material, all the best of its type, is under the care of an engineering corps of eminent scientists, including the famous Dr. Plimmon H. Dudley, inventor of the "flawless rail," who has devoted a life-time to the study of steel. Dr. Dudley has invented a number of instruments without duplicates, for the purpose of measuring stresses in rails as trains pass over them, for detecting and marking slight inequalities in level and alignment and thus facilitating the work of the maintenance-of-way forces.

Real Estate and Equipment

The net result of all this engineering care is a track so smooth riding as to be a matter of general comment among travelers. It may be remarked in passing that this unrivaled roadway is a matter of even livelier interest to the stockholders than to passengers, because it means that heavier trains can be operated at higher speed with minimum wear and tear, which means decreased costs and economy that might be reflected in dividends.

In addition to these items a great railroad is required to make heavy investments which, at first blush, may seem

rather remotely connected with railroading. The New York Central's investment in power plants and transmission systems in the New York City electric zone amounts to about \$15,000,000. The company owns four gas-producing plants, seven large grain elevators and a considerable number of smaller ones. It owns or leases 64 wharves and docks, including elaborately equipped coal and ore-handling wharves.

The number of buildings is amazing. Including all kinds, from the splendid Grand Central Terminal in New York City to minor wooden structures, the total is 21,376 buildings.

Terminals, too, represent a very large investment in real estate. Between New York and Buffalo alone the company owns 4,760 acres devoted to terminals, assessed at \$104,919,924. This does not include Grand Central Terminal, which represents more than \$75,000,000. For the year 1916, the company's tax assessments in New York City alone, including special franchise taxes, were \$126,854,403. Figures are not available for the amount of rural land embraced in the company's right-of-way, but the titles thereto East of Buffalo are recorded in more than 30,000 deeds.

Equipment is in keeping with the roadway, which is to say that it is modern and of the best type and in first class repair. The quantity required is enormous. Of the 64,131 locomotives owned by "Class I" roads in 1919, 6,374, valued at \$136,346,631, belonged to the New York Central. This included 74 electric locomotives, the greatest number under a single ownership anywhere in the world, required to operate through-passenger trains in the New York City electric zone.

Suburban passenger trains are operated by 205 motor cars. Of all the passenger cars in the country, numbering 52,048, the New York Central owns 4,895, costing \$45,897,846. Of the grand total of 2,380,096 freight train cars on "Class I" roads the New York Central owns 269,353, valued at \$288,124,480. To this huge total must be added work equipment to the number of 12,190 pieces, valued at \$11,896,314.

If all these engines and cars were coupled into a single train, it would form a continuous line 2,428 miles long; or sufficient to reach from Grand Central Terminal in New York City by the most direct rail route to a point in Weber Canyon, 24 miles East of Ogden Utah.

Even these formidable figures do not tell the whole story, for a large amount of freight in New York is received and delivered by car floats or lighters. At Boston and other points, also, the road must be amphibious in order to render full service. This requires marine equipment to the total number of 306 craft of all kinds, valued at \$6,559,272, which brings the grand total investment in equipment required to operate New York Central Lines to \$488,824,546. Shop machinery valued at \$10,000,000 is employed in keeping this equipment in repair.

Summarizing the various items mentioned, roadway, structures and equipment, the property investment in all New York Central Lines is approximately \$1,700,000,000.

Having invested so huge a sum the company cannot regard the transaction as closed like a deal in government bonds which can be locked up in a vault without further care or attention. In order to keep pace with the growing necessities of the great empire served by its lines, the company is always under the driving necessity of improving and enlarging its transportation facilities, not only to handle more traffic, but to handle it more expeditiously and economically. From 1900 to 1915, the company paid out \$402,382,000 for additions, betterments and new construction. From 1915 to 1919, the sum of \$120,813,000 was paid out for additions and betterments; and this it will be noted included the war period and the period of Government control, when such outlays were kept down to a minimum. These items must not be confused with operating expenses such as maintenance-of-way and maintenance-of-equipment, which are totally different affairs. Just to give an idea of the character of these improvements note these items: Grade separation at Chicago \$7,000,000; grade separation at Erie, \$1,660,000; additional tracks and signals at Utica and freight and passenger terminals, \$6,000,000; new yard at Gardenville, on the outskirts of Buffalo, \$7,000,000; yards, engine terminal and car repair facilities at Air Line Junction, near Toledo, \$3,000,000; car shops at Ashtabula, \$1,000,000.

Since 1910 a series of improvements on the Hudson River division has been under way, involving an outlay of \$15,000,000 and including such items as four-tracking the entire distance from New York to Albany. The task includes extensive relocation, elimination of grades and curvature, widening cuts and embankments, building new bridges and tunnels, new stations, new signals and a wearisome list of other details.

Big Projects Always Pressing

Like woman's work, a railroad is never done. Now that the roads have been returned to the owners, the New York Central management has before it for early decision almost numberless projects for improvements and additions. New equipment costing more than \$50,000,000 was ordered early in 1920.

Just a few minor projects for the elimination of grade crossings involve the expenditure of \$1,000,000. The enlargement of existing yards and the construction of new ones with attendant engine terminals, car shops and similar facilities at a half-dozen points where they are most urgently needed will call for the expenditure of \$5,500,000. Then to keep abreast of modern practice in signaling and afford the traveling public the ultimate possible degree of protection will call for an early outlay of \$1,000,000. Such items as

these are mere chicken feed in the budget of so large a corporation as the New York Central.

Larger projects pressing for decision or awaiting the slow processes of legislative or legal procedure are the so-called "Castleton cut-off," including a high bridge across the Hudson River twelve miles below Albany to relieve the pressure on that congested point, which, when completed will shorten the time of freight movement between New York and Boston and the West from three to five days, and which will cost approximately \$20,000,000. Then there is the so-called "West Side Improvement" in New York City, which will bury the tracks along the river from Spuyten Duyvil to St. John's Park, or place them on elevated structures, with piers, freight houses, commercial buildings and so on which will cost more than \$50,000,000. Cleveland, one of the most rapidly growing large cities, already fifth in size in America, has reached the point at which improved railroad facilities are essential and a \$60,000,000 union passenger terminal project already has been launched. At Syracuse and elsewhere heavy expenditures will soon be required for improvements; but perhaps enough has been said to afford an idea of what it means to keep the greatest railroad system in the world abreast of the times or, perhaps, a neck ahead.

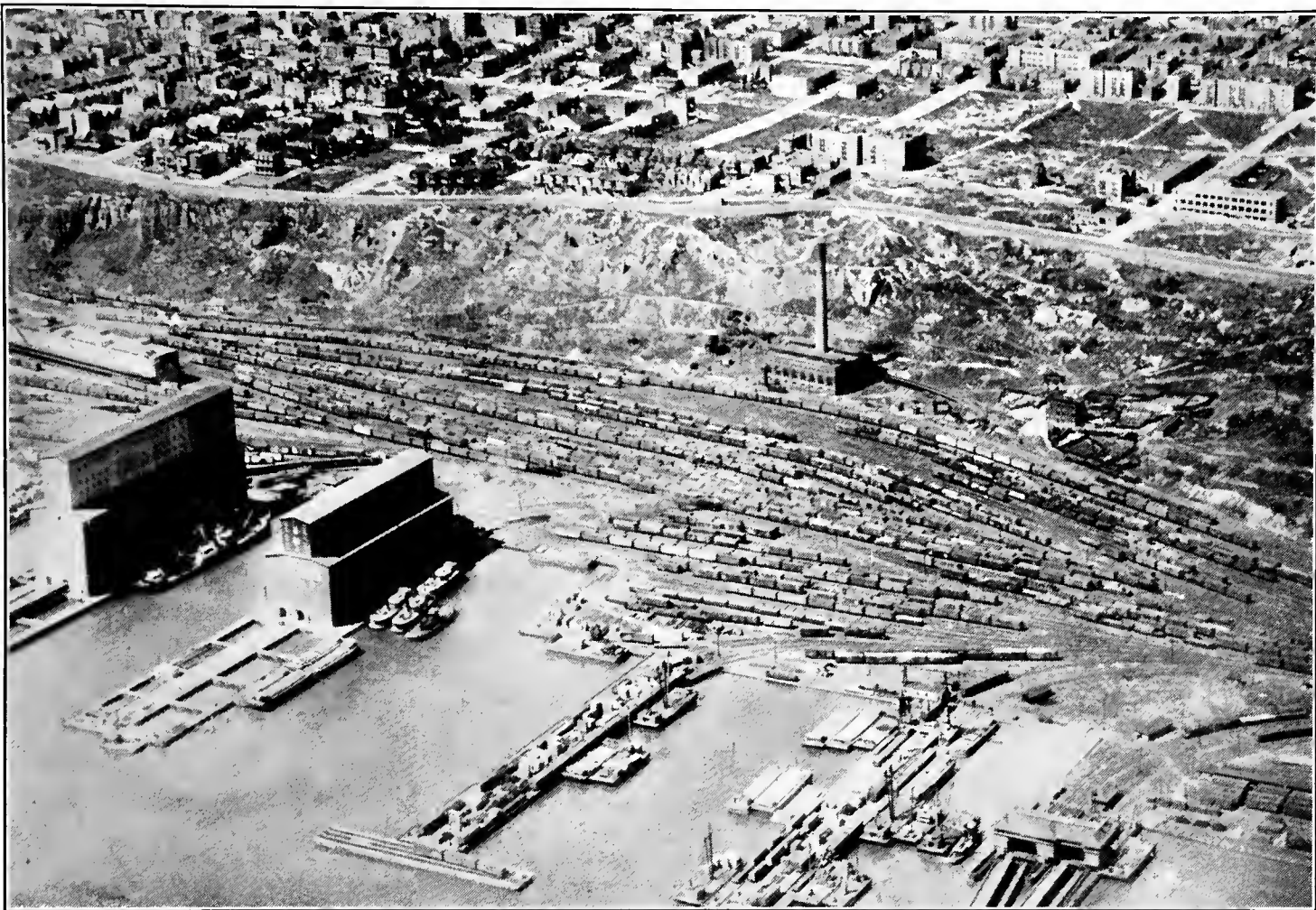
Economical Financing

Under the new era in railroad affairs ushered in by the Transportation Act of 1920 common carriers may venture upon expenditures for new improvements to cope with the growing transportation needs of the country in the assurance that they will be allowed to earn a return on the necessary investment. The New York Central Lines are, fortunately, in a position to benefit by this new era.

The New York Central Railroad, for example, has accomplished its financing in the past through the medium of bond issues of one sort or another. While the stock outstanding is \$249,592,000, the total funded debt actually outstanding is \$671,654,782. Although the rate for money is now high, the New York Central Railroad has in the last twenty-five years effected substantial reductions in the cost of carrying its obligations by refundings and consolidations, so that the average rate of interest upon the funded debt is only 4.3 per cent, which is less than the rate on loans of the world's great governments. Furthermore, the greater part of this indebtedness is in obligations which will not mature for a long term of years. Two issues, for example, aggregating \$144,000,000, at 3.5 per cent, mature in 1997. Other issues mature at various periods up to the year 2013, while one issue of \$49,994,000 of West Shore bonds bearing 4 per cent interest and guaranteed by the New York Central will not fall due until the year 2361, or 441 years hence. These are believed to be the longest-term securities ever issued.

The point of all this is to be found in the provision of the Transportation Act allowing the carriers rates which will produce 5.5 per cent upon the fair aggregate value of their property devoted to transportation. Application of this rate to the book value of the property of the New York Central Railroad Company should produce an income of approximately \$55,000,000. The Commission also has the authority to allow an additional one-half of one per cent for improvements, etc. This would amount to \$5,000,000, or a grand total of \$60,000,000. This would enable the company to pay interest on its funded debt, amounting in 1919 to \$29,227,222, rental of leased lines and other corporate charges and should further produce a substantial surplus, amounting to slightly more than 11 per cent on the present capital stock, which could be devoted in part to improvements and in part to such corporate purposes as might be deemed proper.

These figures, it should be borne in mind, relate to the New York Central Railroad only. If, however, the percentages mentioned be applied to the property account of all the New York Central Lines as a whole, the result would undoubtedly be a higher return to the New York Central Railroad Company, all of which will materially strengthen the company's general credit and make its stock an attractive investment.



New York Central's West Shore Yards and Piers at Weehawken, N. J.

More important in the economy of a large corporation than money, materials or machines are the men entrusted with their use. President A. H. Smith has expressed this by saying that the state of the working forces represents 95 per cent of a railroad's efficiency. Throughout its history the New York Central management has pursued a policy which has attracted and retained an exceptional personnel, both officers and employees. For one thing, while "system" is recognized as essential to the successful conduct of railroad operations, an adherence to rules which under small men might paralyze the road is supplanted on the New York Central by a code elastic enough to cover an emergency rather than to create one. The result is what an unimaginative business man would probably describe as high "morale;" but which an artist would call "atmosphere." Whatever it is, it gives staff and working forces a serene confidence in themselves and in the company which accomplishes prodigies in an emergency.

The entrance of the United States into the war took more than ten thousand men, including highly trained engineers and other important employees, from the New York Central into the military and naval services while a still greater number of machinists and other craftsmen went to the munition factories. With depleted forces in the winter of 1917-18, the most severe since railroads were invented, the New York Central carried a tonnage 4.26 per cent greater

than in the preceding year, which, in turn had shown an increase of no less than 20.86 per cent over 1915. Train and yard men worked in low temperatures and snowstorms until hands and faces were frozen, winning for the New York Central the distinction of being the only trunk line which remained open when Europe's premiers had cabled that "unless America can send food faster the Allies cannot guarantee to hold out."

Other notable manifestations of character and stability were afforded in the so-called "outlaw" strikes in the spring of 1920 and in the shopmen's strike which preceded them. While there were defections from the ranks, such New York Central men as did quit work were the last to go and the first to return, while the loyal majority, with the aid of pensioners who volunteered to return to duty, and the exertions of the officers who sprang into the breach, were able to maintain practically complete service so that the net result was that the company actually won popular credit and prestige from these events.

With such a highly developed plant as has been briefly described herein, manned by such an exceptional body of officers and men, the New York Central Lines, operating under a new theory of regulation which concedes to railroad corporations the right to earn a fair return upon their investments, may look forward to a career of increased public service and prosperity.

New York City,

CHARLES FREDERICK CARTER.

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